



## Seed laws, certification and standardization: outlawing informal seed systems in the Global South

Tamara Wattnem

To cite this article: Tamara Wattnem (2016): Seed laws, certification and standardization: outlawing informal seed systems in the Global South, The Journal of Peasant Studies

To link to this article: <http://dx.doi.org/10.1080/03066150.2015.1130702>



Published online: 17 Mar 2016.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

## Seed laws, certification and standardization: outlawing informal seed systems in the Global South

Tamara Wattnem

A series of relatively new seed laws are becoming novel mechanisms of accumulation by dispossession in agriculture. Many researchers have argued that intellectual property rights (IPR) laws that apply to living materials dispossess people of seeds by privatizing germplasm. What these authors have not addressed is the role that non-IPR-related seed laws play in the seed enclosure. I argue that we should pay more attention to the implications of seed laws and regulations that do not deal directly with IPR issues, because they are also being used to outlaw practices that are necessary for the functioning of informal seed systems. As a result, they are setting the stage for the further erosion of seed sovereignty and are becoming an additional threat to an already waning agro-biodiversity, with direct consequences for farmers' livelihoods. These seed laws establish certification requirements and quality standards for the marketing and/or exchange of seeds. I use the example of contemporary Colombian seed politics to illustrate how and why certification requirements and quality standards are currently being introduced throughout the Global South. I draw on insights from the standards literature in order to explain the power, limitations and consequences of these laws.

**Keywords:** certification; food sovereignty; seed laws; seed sovereignty; seed systems; standards; Colombia

### Introduction

By ignoring standards and the disputes about them, we risk missing one of the most important aspects of the transformation of agriculture and contemporary rural life itself.

– Lawrence Busch (2000, 274)

As the seed industry expands and the agro-industrial complex becomes more powerful, the continued viability of local seed systems and the legality of various types of germplasm<sup>1</sup> commons are facing a series of threats. Seed sovereignty – defined as people's right to save, replant, breed and share seeds, and their right to participate in decision-making processes regarding rules and laws that regulate their access and use – is menaced (Kloppen- burg 2013). This is a dramatic change when placed in historical perspective. Until about a century ago, most people thought of seeds as a public good, as the common heritage of

---

<sup>1</sup>The term 'germplasm' refers to all living tissues and genetic materials (such as seeds or a piece of stem) from which new plants and organisms can grow. Throughout the paper, I will use the terms 'seed' and 'germplasm' interchangeably, even though they are not exactly the same thing. All seeds are germplasm, but not all germplasm is necessarily a seed.

humanity and/or as a resource to be shared freely amongst the farmers and gardeners of the planet.

Two major processes led to the systematic erosion of seed sovereignty worldwide: one biological and the other socio-political. With regard to biology, advances in genetics and plant breeding in the first half of the twentieth century allowed for the development of the modern seed industry, which offers seed varieties that farmers cannot easily save and replant the next season, and thus pushes them to buy seed every year. Hybrid seeds exemplify this phenomenon (Fitzgerald 1990; Vellvé 1992). In socio-political terms, a series of legal changes have facilitated the patenting and ‘protecting’ of germplasm via mechanisms such as plant breeders’ rights (PBR). Together, these biological and political changes have set the stage for the possibility of commodifying and monopolizing seeds (Kloppenburger 1988).

In the last 50 years – and more so in the last 20 – there have been rapid and profound changes in the legal status of germplasm globally. Numerous researchers have stressed that the introduction of different types of intellectual property rights (IPR) laws for plant genetic resources is one of the legal mechanisms underwriting contemporary processes of accumulation by dispossession that further enclose agricultural commons (Aoki 2008; Harvey 2003; Kloppenburger 1988, 2010; Mooney 1979). They have paid particular attention to the implications of patent laws that regulate and facilitate the cultivation of genetically modified crops (Fitting 2011; McMichael 2009; Otero 2008). These laws are certainly worth paying attention to, as they are indeed eroding seed sovereignty by privatizing genetic material and banning seed saving. In spite of their importance, I argue that it is equally important to pay attention to a simpler and in some senses more dangerous mechanism of dispossession: seed laws requiring mandatory certification and compliance with particular quality standards for commercializing and sharing seeds.

The central purpose of this contribution is to explain how non-IPR-centered legislation is being used to dispossess farmers of control over their seeds throughout the Global South. As I hope to make clear, seemingly impartial and harmless regulations that seek to institutionalize standards for germplasm production, marketing and exchange are becoming tools for the dissolution of farmers’ seed systems and, as a result, are a threat to a waning agrobiodiversity and to the already precarious livelihoods of farmers. I do not mean to imply that seed laws are more important than IPR laws; they are both significant and often work together towards similar ends. What I am suggesting is that the extensive consequences of non-IPR-related seed regulations are generally under-emphasized and at times outright ignored. In the spirit of filling this gap, I will analyze the history and repercussions of seed laws that deal with seed quality, certification and standardization. This is also not to deny that oftentimes farmers do welcome seed certification schemes, especially because they can help guarantee seed quality (Cooke 2002).

In order to best understand the implications and assumptions behind the myriad of seed laws arising worldwide, I begin by clarifying the major differences between formal and informal seed systems. I then frame the analysis with a discussion of the nature of standards and standardization, since seed laws are, after all, inherently about standardization. Next, I provide a brief historical overview of how seed laws were used to institutionalize particular standards for seed production and exchange in Western Europe and the United States. This historical background will aid in the understanding of contemporary debates over seed laws in other countries. Next, I examine how new seed laws throughout the Global South are threatening and, in the worst cases, completely outlawing informal seed systems. I then provide examples from Latin America, with special attention to the Colombian case. By way of conclusion, I comment on the broader implications of these laws as well as on the prospects for seed sovereignty.

### The importance of informal seed systems

Seed legislation matters, in part, because it defines and shapes the type of seed systems that can exist in a particular country. The term ‘seed system’ refers to the totality of processes that are part of the development, maintenance, production, storage and diffusion of cultivars (Tripp 1997). Scientists often make a distinction between ‘formal seed systems’ – or heavily regulated systems made up of public institutions and private industries engaged in scientific plant breeding – and ‘informal’ or farmers’ seed systems – which are almost completely unregulated and dependent on farmers’ knowledge. The formal seed sector is made possible by and dependent on the germplasm maintained by farmers in the informal one. Modern industrial agriculture calls for and depends on improved seed distributed via the formal seed sector, which is made up of ‘organizations responsible for the supply, distribution and marketing of quality-controlled seed, often backed by formal policies and legislation’ (McAndrew 2001, 198). This formal sector coexists with the informal one. In much of the Global South, informal seed systems that include the continued use of native and non-certified varieties, seed exchange networks and widespread seed saving are still the preferred seed source for most farmers, especially smaller scale growers and indigenous populations farming in extreme conditions. There is not always a clear-cut border between formal and informal systems, however; in fact, they often overlap.

It is now estimated that ‘ten companies account for about two-thirds (65 percent) of the world’s proprietary seed – that is, branded varieties subject to intellectual property protections – for major crops’ (Hubbard 2009). These seeds are usually distributed via the formal seed sector. Despite the exponential growth of the formal seed sector in recent decades, the persistence and vitality of local seed systems in many parts of the world is unquestionable. In the Global South, somewhere between 60 and 100 percent of the seeds planted are farmer produced and exchanged – depending on the crop and the country (Louwaars 2002). In Latin American and Caribbean nations, the Food and Agriculture Organization of the World Health Organization (FAO) estimates that around 75 percent of the seeds used are supplied through local or ‘informal’ seed systems (Santilli 2012). With such a large potential market to tap into, seed companies are actively working to expand their markets throughout the Global South. The dissolution of so-called ‘informal seed systems’, however, is a prerequisite for the growth and consolidation of private seed companies in such countries. One way to dissolve informal seed systems is to make them illegal, which is what some new seed laws are attempting to do.

Informal seed systems are crucial for the preservation of *in situ* agro-biodiversity and for the present and future of plant breeding (Almekinders 2000). They are also important for rural cultures, food security and farmer autonomy. Even if it is imperative to acknowledge the virtues of vibrant local seed systems, it is also important not to romanticize them; some work well, others less well. The common

conclusion of the studies on informal seed diffusion is that the speed and effectiveness of the system depends largely on: the quality of the variety to be diffused; kinship relationships; the existence of a culture of local agricultural experimentation; and the economic stability of the farming enterprise. (McAndrew 2001, 198)

Regardless of the virtues or weaknesses of informal seed systems in a particular place, it is unrealistic and undesirable to have a formal seed sector that is capable of supplying 100 percent of the seeds of all crops planted (Louwaars 2002). Nowhere in the world – not even in the Global North – do formal seed systems exist without parallel and unregulated

farmers' seed systems. Still, arguments about the need for standardization in the name of phytosanitation, legality, productivity and food security are currently being used to design and implement laws that make it possible for the state to outlaw practices needed for the functioning of informal seed systems in several countries. This does not necessarily mean, however, that local practices are conforming to state designs or that these regulations are systematically enforced, but there are nonetheless multiple efforts worldwide that are attempting to change farmers' practices. Before discussing the details and histories of particular laws, I will first briefly discuss the importance of standards and standardization.

### **The power of standards and standardization**

Who participates in setting the standards, the processes by which standards are set and what the consequences of setting the standards are have considerable impact on fundamental questions about who we are and how we shall live.

– Lawrence Busch (2000, 273)

Standards and standardization procedures are ubiquitous in the modern world (Brunsson and Jacobsson 2000). As a noun, a standard is a set of criteria that something must meet to be considered worthy. As a verb – to standardize – the implication is that something must be made uniform. Standards are important in large part because they are 'the means by which we judge persons, processes, and things to be superior, acceptable, or unacceptable' (Busch 2011b, 1). Those who can define and enforce standards are powerful especially because they have 'the ability to set the rules that others must follow, or to set the range of categories from which they may choose' (Busch 2011a, 28). Conceptualizing standards in this way implies they are part of the moral order of the modern world insofar as they set norms for behavior and standardize things, workers, markets, capitalists, standards themselves, standard creators, consumers and the environment (Bowker and Star 1999). Following scholars who have insisted on the power-laden nature of standards (Brunsson and Jacobsson 2000; Lampland and Star 2009; Olshan 1993), I will argue that even if standards 'appear to be neutral, benign, merely technical, obscure, and removed from daily life, they are ... largely an unrecognized but extremely important and growing source of social, political, and economic relations of power' (Busch 2011a, 28).

The needs of industrial agriculture neatly illustrate the ways in which the implementation of particular standards has implications for all of the people and things that come into contact with them. For example, the new technologies developed after the Green Revolution

only worked to the extent that new standards were met. These required seed producers, fertilizer suppliers, farmers, machinery designers and even processors to behave in certain ways. Unless all of the actors in the process were properly disciplined and standardized, such that all the products that they produced were standard as well, the entire Green Revolution technology chain was and would remain blocked. (Busch 2000, 278)

The standardization of the seed, of course, was an essential element of the Green Revolution and of industrial agriculture more broadly. Today, the enforcement of non-IPR-related seed laws is essentially about making sure that seed production and marketing meet certain pre-established standards and procedures.

There are at least four characteristics of standards that make them especially powerful and worth paying close attention to:

1. Once instituted, they tend to become obvious, natural, invisible, and even seemingly unworthy of reflection (Bowker and Star 1999; Olshan 1993).
2. They deflect attention away from the rulers by displaying anonymous power.
3. They tend to embody the biases and preferences of the rulers and of the powerful.
4. They generate path dependence and rigidify production regimes, making it difficult to discard them and/or to reimagine them (Busch 2011a).

Despite their power, the creation, implementation, legitimization and naturalization of standards is not always a simple task. In many cases, the emergence of any particular standard is the result of conflict and disagreements, because in choosing one standard over another there are inevitably both winners and losers. The politics of seed laws is a case where the attempt to enforce particular standards *has* generated visible opposition and has not been able to turn the standards into deceptively natural and apolitical requirements. This, I think, is in part due to the fact that many seed laws embody high-modernist designs that fail to account for historical and local forms of knowledge and practices, including the practices required for sustaining vibrant informal seed systems. Scott defines high-modernist ideology as

A strong, one might even say muscle-bound, version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and, above all, the rational design of social order commensurate with the scientific understanding of natural laws. (Scott 1998, p.4)

Many of the practices of the private seed industry, as well as many public policies serving the dominant agro-industrial model, can be thought of as part of high-modernist schemes. I will return to the implications of this issue later in the paper.

### **Seed laws and certification requirements in historical perspective**

Along with the modernization of agriculture came the development of a series of standards and standardization procedures for practically all aspects of production. Some of these standards were eventually transformed into laws that molded the expectations and practices of those in the seed industry. The United States and the nations of Western Europe have the oldest and best-institutionalized legal frameworks regulating germplasm. In this section I will explain the diverse types of laws that have emerged in the Global North. This information will serve as background to better understand contemporary debates about seed laws in the Global South.

#### ***Different types of seed laws***

Broadly speaking, there are two different types of laws that have facilitated the commodification of plants and contributed to the erosion of seed sovereignty worldwide:

1. IPR laws applicable to germplasm that authorize and legitimize its privatization through mechanisms such as plant variety protection acts, PBR, 'sui generis systems', or patent laws for living materials.
2. Non-IPR seed laws that oblige farmers, breeders and seed companies to certify and/or register seeds according to pre-established standards, usually for marketing or



exchange purposes. The intention is to regulate seed quality, identity, production, marketing and use.

It is common for countries to have separate laws or decrees for each of these issues, though this varies considerably. In fact, the distinction between the two types of seed laws is not always clear cut, and there are cases in which one law addresses both issues, at least implicitly. Nonetheless, for analytical purposes it is useful to clarify the major differences.

Given that laws dealing with PBR have been especially important for the seed industry in both the private and public sectors, PBR deserves more detailed explanation. PBR laws are often a copy or a revised version of the Convention of the International Union for the Protection of New Plant Varieties (or UPOV, by its French acronym). The UPOV Convention is arguably the most important multilateral convention that lays down the guidelines by which a breeder can protect 'new' plant varieties with an IPR referred to as 'the breeder's right'.

The breeder's right means that the authorization of the breeder is required to propagate the variety for commercial purposes. Under the UPOV Convention, the breeder's right is only granted where the variety is (i) new, (ii) distinct, (iii) uniform, (iv) stable and has a suitable denomination. (UPOV website)

These criteria are often referred to as 'DUS', which stands for distinct, uniform and stable.<sup>2</sup> The DUS expectation, with all the standards that come along with it, looms large in both IPR- and non-IPR-related seed laws.

Based in Switzerland, UPOV was established in 1961 with six members, grew to around 20 members in the early 1990s and had 72 members as of 2014. The UPOV Convention has been modified several times. The latest version was approved in 1991, and it is characterized by a noticeable progression towards more patent-like rights for breeders. The 1978 version included the 'breeder's exemption' and 'farmer's privilege' clauses, according to which breeders could freely use any protected varieties and farmers could save seeds to plant the next season. It also allowed countries to exclude certain species from any form of protection if they wanted to do so. The 1991 version did away with these clauses and hence expanded breeders' rights significantly. As summarized by GRAIN – an independent research and analysis non-profit organization that supports small farmers and their movements –

The expanded rights now allowed under UPOV-91 imply total market control for breeders over their varieties' reproductive material. Farmers using protected varieties cannot sell their harvest as seed and, in a growing number of UPOV member countries, they can not even save their own seeds or exchange them on a non-commercial basis. Farmers must now pay royalties every year when they buy seeds, and they may only plant the protected variety to produce seeds if the breeder grants them a specific license to do so. (GRAIN 1999 in Wilkinson and German Castelli 2000)

<sup>2</sup>A variety is regarded as distinct if it is 'clearly distinguishable on one or more important characteristics from any other variety known in the Community', and as stable if it 'remains true to the descriptions of its essential characteristics' after successive propagation or multiplications or at the end of each cycle. If, 'apart from a very few aberrations, the plants of which it is composed are (account being taken of the distinctive features of the reproductive systems of the plants) similar or genetically identical as regards the characteristics, taken as a whole, which are considered for this purpose', a variety is also regarded as sufficiently uniform (Winge 2012).

Only a handful of countries in the Global South had functioning PBR laws in the 1990s, but by 2013, 71 nations were part of UPOV. In Latin America, only Argentina, Chile and Uruguay implemented PBR before the 1990s, with varying degrees of implementation capacity. Mexico and Colombia followed. In all of them, farmers were initially allowed to save seed to re-sow the next season as stipulated by UPOV 1978.<sup>3</sup> As of 2013, however, 12 Latin American countries were officially members of UPOV, and some of them were trying to implement rules from UPOV 1991, restricting seed saving and exchange to unprecedented degrees. US and European governments and seed industry leaders were promoting the adoption of UPOV 1991 worldwide, perhaps most effectively as part of bilateral trade agreements. Many nations are, indeed, adopting the 1991 UPOV Convention. Attempts to introduce legislation that implements UPOV 1991 has provoked polarized debates in several countries, and will likely continue to do so.

Having explained the importance of UPOV, I will now move to a discussion of the history of non-IPR-specific seed laws in Europe and the United States. This historical contextualization is telling because most seed laws are imitations, albeit with some modifications, of Global North versions. Although I will concentrate on the roles and implications of non-IPR-related seed laws, it is important to keep in mind that IPR laws such as PBR regulations are intimately connected to the rise of quality-related seed laws, and that they tend to work together.

### *The European system*

Seed laws and regulations first appeared in Europe in the first half of the twentieth century as a result of pressure from both seed producers and farmers to put an end to generalized confusion and mistrust around crop variety names (Louwaars 2002; Winge 2012). The creation of some sort of centralized database that would prevent the duplication of cultivar names and rebuild trust in the industry was seen as a potential solution. The German Agricultural Society is credited for creating the first variety register in 1905 (Winge 2012). In the 1920s, the National Institute for Agricultural Botany in the United Kingdom formed committees whose task was to eliminate synonyms of crop varieties marketed under different names (Tripp 1997). In the 1940s, a series of national seed laws were finally introduced with the intention of creating a more transparent seed market that would ensure quality. These nascent regulations often included registration and certification requirements, with the goal of guaranteeing that ‘new’ varieties were not marketed unless they were genuinely different from already marketed varieties. By forcing producers to link one name with one variety described in detail, competitors would no longer be able to give misleading names to their varieties in an attempt to increase sales (Louwaars 2002).

In the 1960s, there was a qualitative shift in the nature of European seed laws. The countries that then formed the European Economic Community (EEC) – the institution that eventually morphed into the European Union (EU) – decided that it was necessary to harmonize national seed laws in pursuit of more open and standardized Europe-wide seed markets. Hence, in 1966 the EEC passed its first regulations for the marketing of seeds. At the same time, EEC members instituted a European Common Catalogue system for plant species. This meant that from the 1960s on, plant varieties registered in national catalogues also had to be registered in the European Common Catalogue in

<sup>3</sup>For more information on UPOV in Latin America, see Jaffe and Van Wijk (1995) and the UPOV website.



order to be legally marketed. The resulting system, still in existence today, requires that all crop varieties be registered, performance tested, and certified before being sold (Winge 2012). Throughout the years, new directives added complexity to the European system, leading to an arrangement famous for its bureaucratic complexity and an almost obsessive preoccupation with control.

The two main pillars of the European system today are registration and certification. Certification processes include inspection of fields, processing plants, stores and markets with the intent of confirming the origin and varietal purity of seeds. Seeds may also be tested for germination rates, moisture analysis, cleanliness and the absence of pathogens (Louwaars 1997). The logistical implications of the registration and certification requirements are that, in order to be legally marketed in the EU,

a plant variety must be listed in a national catalogue and, depending on the species, in one of the EU Common Catalogues. To qualify for registration, a variety must be demonstrated to be distinct, uniform and stable (DUS), and the rules for naming of varieties must be followed. (Winge 2012)

In addition to registration and certification, another important requirement is what is referred to as ‘VCU testing’ – testing for value for cultivation and use. Initially, some farmers’ associations promoted it so as to validate claims made by seed suppliers (Louwaars 2002). Today, VCU testing is usually done to evaluate a variety’s adaptation to particular conditions (Winge 2012). In summary, the three steps that need to be followed prior to the marketing of almost any germplasm in the EU are:

1. Register the variety, which means fulfilling the DUS criteria;
2. Performance test the variety, i.e., go through VCU testing;
3. Certify seeds that will be sold (Winge 2012).

The Common Catalogue model is an excellent example of what James Scott would call a high-modernist design (Scott 1998). After decades of existence, its limitations and consequences are clear. One of the most frequently mentioned repercussions of the European legal framework is that it has fostered a system in which fewer and fewer crop varieties are marketed. In fact, in the EU it is almost impossible to commercialize old, non-homogeneous and local varieties legally (Da Via 2012). Informal seed systems are institutionally marginalized and considered outdated for large-scale agricultural production (Bocci 2009). Hence, the rules essentially prohibit varietal change and evolution. As a result, the EU system promotes a degree of genetic uniformity that directly undermines biodiversity conservation.

Precisely because the standards are producing undesirable consequences from a genetic erosion and cultural point of view, they have become the subject of intense and polarized debates. In the face of mounting criticisms of the Common Catalogue system, by the late 1990s there was general agreement that it must be at least partially modified. More than a decade after the need to transform the Common Catalogue system was formally acknowledged, however, consensus on how to actually do so is strikingly lacking. The chosen strategy since 1998 has been to promote a new and special catalogue for so-called ‘conservation varieties’ with the hope that it contributes to the conservation of genetic resources at risk of being lost. The idea is to fix the problems produced by one catalogue with another catalogue. By February 2009, however, there was not a single conservation variety being legally marketed in the continent (Bocci 2009). Europeans are undoubtedly facing the challenging and constraining consequences of path dependence inherent to institutionalized standards.

Paradoxically, at the same time that the Common Catalogue system is being questioned and criticized, some countries in the Global South are modeling their new seed laws on the European system. The failure to build well-functioning formal seed systems that preserve agro-biodiversity and local cultures in Europe shows that this logic is not only undesirable but also altogether unrealistic. All that was bracketed in the name of productivity and legality is returning to haunt Europeans. A similar ghost will return to haunt the rest of the world if we continue on this path.

### *The US system*

Despite the similarities in the trajectories of the development of large-scale industrial capitalist agriculture in the United States and Western Europe, these two places managed to come up with strikingly different legal frameworks for plant genetic resources, particularly in terms of the regulations for seed marketing. In the early 1900s, many US states passed legislation that regulated, to varying degrees, the growing seed industry. Like their European counterparts, farmers and seed traders became increasingly concerned with the uses and abuses of inconsistent varietal names for marketing purposes. In 1939, Congress passed a Federal Seeds Act that prohibited the use of synonyms for any single variety. Also, as in Europe, the Department of Agriculture sought to introduce a law that would require compulsory registration of new varieties, but in the face of opposition from seed companies, this never happened (Kloppenburg 1988). Firms feared that heavy government regulations would interfere with their business interests. As a result, the main difference between the European and the US systems today is that the United States does not require mandatory registration, certification or quality testing. This, of course, does not mean that these practices do not exist, but merely that decentralized organizations and associations organize them in a voluntary manner. In fact, many farmers welcomed early certification systems in the United States. They felt empowered in their role as active participants in seed testing processes and valued having a procedure through which to guarantee the quality of the crops they were growing (Cooke 2002). For example, many producers choose to register varieties in the National Variety Review Boards, managed by the independent Association of Official Seed Certifying Agencies, AOSCA (Tripp 1997).

In broad comparative terms, the European system for legally marketing and sharing germplasm involves significantly more regulations and restrictions than does the US model. In Europe, the government regulates standardization, whereas in the United States it is a multi-actor system of governance. One of the implications of such a difference is that genetic uniformity is emphasized to a greater extent in the European Union than in the United States (Winge 2012). Even though the US legal framework is much friendlier to the continued existence of informal seed systems and to the commercialization of non-uniform varieties, this does not mean that genetic erosion is absent. The logic and market dynamics of large-scale agribusiness are such that agricultural landscapes are homogenized and often rely on cultivars that fulfill the DUS criteria, even if it is legal to do otherwise. Even if – unlike Europe – the United States does not have mandatory certification legislation to protect PBRs, it has placed more emphasis on other IPR mechanisms for regulating germplasm, and this arrangement has also resulted in increasingly homogenized seed systems. Patent-based regulation, plant variety protection certificates and the licensing of agricultural intellectual property are the preferred mechanisms for seed regulation in the United States (Winston 2008). This is an important point to keep in mind when thinking about the scope and limitations of legal frameworks for the promotion of a particular end. Even though informal seed systems and the commercialization of non-homogeneous

varieties are legal in the United States, the political economy of agriculture is such that, as in Europe, they are not as widespread as they could – or perhaps – *should* be, if the preservation of biodiversity were a serious objective.

### **Seed laws and regulations in the Global South**

Whereas, in the Global North, the two types of seed laws previously identified emerged largely as a result of domestic pressures and organizations, in the Global South – with a few exceptions – they arose due to transnational pressure from agribusiness companies, bilateral trade agreements, and World Trade Organization (WTO) treaties such as the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). In fact, the TRIPS Agreement practically forced nations to strengthen their IPR regimes, including those regulating biotechnology and plants. Article 27.3 states that WTO members are required to grant some form of IPRs for plant materials – be it patents, PBR or what they refer to as an ‘effective *sui generis* system’. Such a system, says TRIPS, had to be in place by the year 2000 in developing countries, and by 2005 in least developed countries. The pressures of the international political economic system have been undeniably effective, as most nations have passed some sort of Seed Law and IPR Law that address the regulation and control of plant genetic resources. Whether these measures are effectively enforced or not is another story.

At the same time that many countries are implementing laws that facilitate the commodification of reproductive material, most members of the WTO have also signed the Convention on Biological Diversity (CBD), which states that each country has sovereignty over the biological diversity within its territory. The fact that plant genetic resources today are under sovereign control of nation-states means that they are no longer considered – at least under international law – the common heritage of humanity, as they once were. This means that there is no acknowledged global commons when it comes to germplasm, with some exceptions listed in Annex 1 of the International Treaty on Plant Genetic Resources for Food Agriculture. A series of tensions and contradictions result from the fact that, on the one hand, the nation-state is defined as having sovereignty over its genetic resources (so it could theoretically decide to prohibit the privatization of genetic material within its borders), but on the other, the pressures of the globalized world economy virtually force countries to introduce strict seed laws and IPR frameworks for life forms, considerably eroding – and at times annulling – that theoretical sovereignty. It is in the midst of these tensions that many nations throughout the Global South are modifying the way they regulate germplasm. It is to an explanation of the content and implications of new seed laws that I now turn, with a special focus on Latin America, especially Colombia.

### ***Certification as dispossession: cases from Latin America***

It is as if seed evolution itself is being outlawed, and farmers are being made accomplices to the crime.

– (GRAIN October 2013)

An avalanche of new legislation heavily geared toward formal seed system regulation has recently swept Latin America. Similar processes are underway in parts of Africa and Asia as well, but those are beyond the scope of this paper. These laws and regulations borrow heavily from the European model. They are often tainted by high-modernist ideologies and by inherited ideas about the superiority of formal plant breeding and formal seed systems. The European model of certification is more compelling than the US system from

the point of view of the seed industry because it can count on the state for policing the prohibition of seed saving and exchange. Juliana Santilli summarizes the trends for the Latin American region as of 2012 this way:

Despite varying considerably in each country, such laws tend to favor the growth of the private seed sector, and establish mandatory seed registration and certification requirements that can be met only by the large seed industry. With a few exceptions, farmers' seed exchanges and local seed sales are outlawed, and strong penalties are imposed upon those who violate seed laws. Some examples of this trend are the new Mexican seed law (*Ley sobre Producción, Certificación y Comercio de Semillas*), published in June 15, 2007, which replaced the seed law of 1991; the Peruvian seed law (*Ley General de Semillas*) No. 27262, published in May 13, 2000 . . . the Ecuadorian seed law (*Codificación de la Ley de Semillas*), approved in 2004; . . . and the Costa Rican seed law, which is being completely revised by the National Congress. Chile is also revising its current seed legislation . . . to impose stricter rules on registration and certification of seeds. Brazil also enacted a new seed law in 2003, but it is among the few Latin American countries that have ensured (limited) legal space for farmers' seed systems. (Santilli 2012, 49–50)

Justifications and campaigns in favor of the implementation of such laws usually rely on a language of quality control and fear. Unregulated seeds are presented as 'dangerous', potentially contaminated by some disease, or as a threat to national agricultural health and even food security. In the strictest versions, such as the Colombian and Mexican cases, non-registered and non-certified seeds cannot be marketed or exchanged. In other words, if the law were actually implemented as it stands, farmers from a given community would 'not be able to legally exchange seeds without the previous certification by government officials or a private entity that those seeds comply with the standards set by law' (GRAIN 2005). As a result, a series of commonplace and culturally important practices are outlawed, including:

farmers' seed systems, when they involve the production and local exchange of non-tested seed; . . . the restocking of genetic diversity after a disaster; participatory plant breeding, which relies on informal dissemination of new selections; [and] the organization of seed fairs, which aim at sharing locally adapted or selected materials. (Louwaars 2005)

In such cases, the new laws are a direct assault on age-old practices of seed saving and exchange. Additionally, they are a genuine threat to biodiversity, as many local varieties do not meet the DUS standards set by the law, and hence could not be certified even if farmers wanted to do so. A more detailed analysis of the Colombian case follows, as it neatly illustrates what is at stake in the power struggles inherent in the modification of legal frameworks for germplasm elsewhere.

### **Resolution 970 in Colombia**

Illegal seeds, apart from posing sanitary risks, produce poverty in the agricultural sector because they diminish crop productivity, affect farmers' revenues, and shake Colombians' food security.<sup>4</sup>

– Juan Manuel Monroy, Director of *Acosemillas*, Colombia's seed association  
(Dinero.com 2013)

<sup>4</sup>Spanish original: Las semillas ilegales además de riesgos sanitarios, generan pobreza para el sector agropecuario, pues disminuyen la productividad de los cultivos, afectan el bolsillo de los campesinos y la seguridad alimentaria de los colombianos.

For every seed that they confiscate, we will make others germinate, flower, multiply, spread, and walk freely again along with farmers throughout Colombia's fields.<sup>5</sup>

– *Documento de posición por la defensa de las semillas* 2013  
(Position paper for the defense of seeds)

The contemporary politics of seed in Colombia is one of the most dramatic and controversial examples of the attempt to outlaw farmers' seed systems, and of resistance to the imposition of legislation that does so. This case is also part of a larger story about agrarian transformations in the neoliberal era (Acuña 2011; Jaramillo 2002; Machado 2002; Otero 2013). In 2010, a decree titled Resolution 970 was passed that prohibited the commercialization and sharing of all non-certified seeds (Ochoa Jiménez, Cruz Uribe, and Almansa 2013). The introduction of this decree coincided with the negotiations that preceded the signing of the Free Trade Agreement with the United States, in which Colombia agreed to undertake several legal reforms that would bring the country in line with international agribusiness expectations and standards (Coscione and García Pinzón 2014). An updated seed law and the approval of UPOV 1991 were central in this regard.

There are two institutions, one private and one public, that have been crucial for the design and implementation of Colombia's new legislation: Acosemillas and the Colombian Agricultural Institute (ICA). Acosemillas – the Colombian Seed Association – is a private entity that represents the seed and biotech industries. ICA is a public institution that is part of the Ministry for Agriculture and Rural Development. One of its goals is to design 'strategies to prevent, control, and reduce sanitary, biological and chemical risks for animal and plant species and that could affect agricultural production in Colombia' (ICA website). ICA functionaries wrote Resolution 970 since it is one of their responsibilities to produce legislation that regulates the agricultural sector. Together, ICA and Acosemillas want to make sure that the new seed regulations are enforced, allegedly in the name of combating illegality and phytosanitary hazards.

What does Resolution 970 actually say? It states that people can only sell 'legal', i.e., certified, seeds. In order to be certified, a variety must fulfill the DUS and VCU standards, just as in Europe. In fact, ICA can cancel or suspend variety registrations when it can prove that a cultivar has lost its stability, uniformity and/or agronomical value. As in the rest of the world, the vast majority of creole seeds do not fulfill these requirements, which means that under Resolution 970, they cannot be certified. If it is illegal to commercialize uncertified seeds, then the exchange of many local varieties is effectively forbidden. The resolution also contains a registration requirement, meaning that all people and organizations that produce, import, export or store seeds, as well as those that do plant breeding research or agronomic evaluations, must register their production plots with ICA prior to planting. After doing so, they must keep their registration proof in a place that is publicly visible. In addition, it is explicitly forbidden for people to store seeds that do not come from plots authorized by ICA in storage facilities used for certified seeds.

From the point of view of small-scale farmers and participants in informal seed systems, the most dramatic part of the decree is that it forbids farmers from saving, producing, commercializing, sharing free of charge and/or using seeds not registered or certified by ICA without the authorization of ICA. Article 15 details what a farmer has to do if he or she is interested in saving seed from his or her harvest. These are its stipulations:

<sup>5</sup>Spanish original: Por cada semilla que nos decomisen, haremos que estas germinen y florezcan de nuevo, se multipliquen, se esparzan y caminen libremente con los agricultores por los campos de Colombia.



1. Prior to saving seed, farmers must obtain ICA's authorization, indicating where he or she intends to replant that seed.
2. Manage five hectares or less, depending on the species.
3. Not exceed the planting density established for each species.
4. Demonstrate that he or she has used certified or selected seed to begin with and that PBR restrictions are no longer valid for the relevant germplasm.
5. The plot must be at least 1000 meters away from the next farmer growing the same species.
6. Use it personally and not share it with others under any terms. The farmer can only save seed once but not sell it, and the possibility to do so is not valid for fruits, ornamental plants, forestry species or genetically modified seeds.
7. Additional restrictions may apply, warns the law (Resolution 970 2010).

ICA took the lead in launching so-called national 'brigades for the control of seed use and commercialization', with the staunch support of Acosemillas. Its budget was increased so that it could hire personnel qualified to run national brigades that 'counteract the illegality scourge that is menacing national agricultural sanitation', as stated by ICA's seed director Ana Luisa Díaz (Grupo Semillas 2013). ICA's staff is authorized to enter any farm and make inspections and seed confiscations, destroy seeds and bring to court any farmer breaking the law. Alas, ICA was turned into the ultimate authority determining what farmers can and cannot do with germplasm.

Between 2010 and 2011, ICA reported the confiscation of 1,167,225 kg of seed, the majority of which was rice but which also included potato, maize, wheat, beans and others. In 2012, ICA rejected 2,793,392 kg of rice seed for not complying with the stipulated standards (Grupo Semillas 2013). The confiscation and destruction of 'illegal' seeds became a national and even international controversy when, in an attempt to implement this infamous law, around 70 tons of uncertified rice seeds were publicly destroyed in a landfill in the state of Huila. At the time, Acosemillas and Fedearroz (the rice federation) pronounced themselves in favor of the measures adopted by ICA against 'pirate' inputs. This event is portrayed in the polemic documentary *9.70* by Victoria Solano (2013), which contributed significantly to the visibility and politicization of these procedures.

In 2013, a massive national movement made up of a diversity of social actors exploded in Colombia. It was labeled the *Paro Nacional Agrario* – National Agrarian Strike – and, as the name suggests, farmers were at the forefront of this broader mobilization (GRAIN September 2013). One of the main demands was the suspension or, at a minimum, the renegotiation of the Free Trade Agreement with the United States and the repeal of Resolution 970 (Coscione and García Pinzón 2014). Other important demands included

financial and political support for agricultural production, access to land, recognition of *campesino*, indigenous and Afro-descendant territories, the ability to practice small-scale mining, the guarantees of political rights of rural communities, and social investment in rural areas, including in education, healthcare, housing and infrastructure. (Duranti 2013)

A small-scale potato farmer who participated in the *Paro Agrario* expressed: 'We're asking for conditions and agricultural policies that allow us to survive' (Duranti 2013).

In the aftermath of popular resistance, the government was forced to 'freeze' Resolution 970, and announced that it would consider some modifications to the ill-famed decree. The government agreed not to apply Resolution 970 to national varieties until they could agree on a new proposal regarding seed certification. This small though important victory is



representative of broader struggles and conflicts over the control of germplasm in other parts of the world. As of 2015, it was unclear whether the decree would be kept the same, modified slightly/significantly or repealed altogether. The Colombian example clearly reveals the tensions and conflicts produced by the intent of capital to expand its reach in agriculture with the complicity of the state by claiming that particular standards are necessary in the name of science and phytosanitation. It is important to highlight that these types of state-directed and state-policed mandatory certification policies are not only an important issue in Colombia and other Latin American countries today – they have also been documented in some African nations, such as Kenya, Uganda and Malawi. Not all cases are as dramatic as the Colombian one; there exist different degrees of regulation and ‘legality’ with regards to seed systems. Even though the details vary depending on each country, the question of seed certification and standardization is on the table throughout the Global South, and we are likely to continue to see debates and resistance around this issue worldwide.

### **Conclusion**

Ask yourself who established those standards and what justifications they used in establishing them. Think of who wins and who loses as a result of standards. Think of what virtues and vices are made manifest through standards. Ask yourself whose rights are supported and whose rights are abridged as a result of standards. And, perhaps most important, ask yourself how standards might be used, modified, or transformed to produce a more just and caring world.

– Lawrence Busch (2011a, 309)

### ***The dangers of mandatory certification schemes for regulating germplasm***

Behind the façade of the seemingly good intentions of the certification and standardization requirements of many new seed laws lie a series of negative consequences, especially for seed sovereignty, farmers’ livelihoods and agro-biodiversity conservation. One of the most obvious consequences is that broadly held values of seed saving and seed exchange are increasingly threatened, outlawed and policed. The rising criminalization of seed saving is made manifest in things like massive burnings of non-certified ‘illegal’ seeds; in systematic inspection brigades and public threats that try to make sure that IPR and certification regimes are complied with; and in ‘denounce your neighbor’ hotlines and websites – all of which contribute to the manufacturing of mistrust and suspicion in rural communities. In place of an ethic of collaboration and sharing in agriculture, we are witnessing the promotion of an ethic of individualism and policing. Relative autonomy in food production, another fundamental value for small-scale farmers, is also being undermined. Lastly, these laws have underpinned the dramatic concentration, growth and power of the seed industry that exists today.

I do not mean to imply that farmers’ lives would be immediately and magically better if we only did away with standards and standardization. The problem is not certification or standardization per se, but rather the particular types of standards that are being institutionalized and their biases and consequences. It is important to recall that, historically, seed certification and quality control programs emerged at least partly in order ‘to help farmers who purchase seed, since both the variety and the quality of the seed can rarely be observed from a visual inspection of the seed itself’ (Louwaars 2005). Even today, some farmers value certification procedures that protect them from acquiring substandard seed (Cooke 2002). I have argued, however, that seed laws that institutionalize and regulate

the seed trade have had many more implications other than ‘helping farmers’ by preventing seed companies from deceiving them. If we are to have vibrant seed systems that promote *in situ* preservation of agro-biodiversity, many nations’ seed and agricultural policies need to be redesigned. At a minimum, certification processes should be voluntary. If farmers value the benefits of selling, exchanging or purchasing certified seed, then they should have the option to do that, but they should not be forced to.

Seed laws establishing some form of mandatory certification are undesirable because they virtually eliminate and invalidate local knowledge. They embody what Scott correctly describes as a ‘willful disdain for local competence’ (Scott 1998, 286). By ignoring local forms of knowledge, they deem such ways of knowing inferior and/or insufficient. As a result, history, culture and tradition are seen as things that must be abandoned, overcome and replaced by the superior products and procedures devised by modern science and private industries. My critique of these laws, then, is simultaneously ‘a case for the indispensable role of practical knowledge, informal processes, and improvisation in the face of unpredictability’ (Scott 1998, 6).

### *Prospects for seed sovereignty*

If food and seed sovereignty are to be achieved, we need a different model for the regulation of plant genetic resources. In the face of genetic erosion, ecological degradation, climate change and widespread hunger, we need a tad of postmodern skepticism about the promises of standardized agriculture. As suggested by Kloppenburg, the central organizing feature of a legal framework that prioritizes and defends seed sovereignty would be distinguished for its

commitment to institutionalized recognition of genetic resources and associated cultural/indigenous/community knowledge as a broadly social product, a collective heritage of farming communities that is to be freely exchanged and disseminated for the benefit of all. Seed sovereignty therefore entails creation of a legally defined space in which sharing is unimpeded but is protected from appropriation by monopolists. (Kloppenbug 2010, 385)

The existence of growing opposition movements and the difficulty of actually enforcing certification requirements in countries with thriving informal seed systems are reasons for optimism. Biology and cultural practices are on the people’s side when it comes to preserving informal seed systems in many places. Seed saving and exchange is difficult to police, so we have good reason to believe that the enforcement of laws that outlaw them is likely to be imperfect, to say the least. ‘We must keep in mind not only the capacity of state simplifications to transform the world but also the capacity of the society to modify, subvert, block, and even overturn the categories imposed upon it’ (Scott 1998, 49). Still, whereas seed sovereignty was once taken for granted, it has now acquired the aura of a utopia that requires defense, protection and reconstruction. Given the relative novelty of many seed laws, though, it is still conceivable that the ‘rules of the game’ can be challenged and perhaps reversed.

Broadly speaking, there are at least five directions that struggles for seed sovereignty could take and, in some cases, are already taking worldwide.<sup>6</sup> They are:

---

<sup>6</sup>The relative merits and efficacy of each of these strategies will vary between countries. A detailed discussion of this issue is beyond the scope of the paper, but the broader point is that people around the world are actively thinking about alternatives.

1. A generalized defiance and disobedience of seed laws that attempt to dispossess farmers of their seeds, while simultaneously strengthening local and national seed systems.
2. Opposition to and struggles against laws that facilitate the privatization of germplasm and the outlawing of seed saving, and the demand for and implementation of laws that protect customary practices.
3. The creation and implementation of a tool inspired by the logic of the open-source software movement to create a protected commons for germplasm of interest (Kloppenburger 2013).
4. A more comprehensive struggle demanding a new agricultural paradigm that institutionalizes the idea that guaranteed access to culturally appropriate and sustainably produced food should be a human right, and hence cannot be treated solely as a commodity.
5. A combination of any of the above points.

Seed sovereignty by itself, of course, is not sufficient to guarantee that farmers live healthy and happy lives. Access to land, water and other resources in the communities in which they live are also important issues to consider. Control over germplasm, however, is a fundamental prerequisite for the construction of a more just agricultural sector. As Kloppenburger reminds us, the possibility of food sovereignty depends, at least in part, on achieving seed sovereignty. Struggles for seed sovereignty and the preservation of crop biodiversity, nonetheless, are tightly linked to broader and more difficult disputes over competing agricultural paradigms. Consequently, debates about what seed systems and seed laws ought to look like if we want a more sustainable agricultural model inevitably raise difficult questions. Should agriculture merely be seen as a business and hence have productivity and efficiency at its center? Or are there other issues at stake, such as the preservation of biodiversity, culture and self-sufficiency that deserve equal attention? What role should the state play in agriculture if we want to guarantee food sovereignty and preserve agro-biodiversity? The battle of ideas in this regard will continue, as will the struggle over the content of legal frameworks for living materials that are dramatically transforming the relationships between farmers, nation-states, multinationals and germplasm worldwide. The underlying issue is whether plant genetic resources will be increasingly treated as private property or whether they will be used freely and cooperatively to nourish humanity.

### **Acknowledgements**

A special thank you to Jack Kloppenburger, without whose insights and wonderful mentorship this contribution would not have been possible.

### **Disclosure statement**

No potential conflict of interest was reported by the author.

### **References**

- Acuña, I. 2011. De campesinos a empresarios: la retórica neoliberal de la política agraria en Colombia. *Espacio Abierto Cuaderno Venezolano de Sociología* 20, no. 4: 641–657.
- Almekinders, C. 2000. The importance of informal seed sector and its relation with the legislative framework. Paper presented at GTZ-Eschborn. July 4–5, 2000.

- Aoki, K. 2008. *Seed wars: Controversies and cases on plant genetic resources and intellectual property*. Durham: Carolina Academic Press.
- Bocci, R. 2009. Seed legislation and agrobiodiversity: conservation varieties. *Journal of Agriculture and Environment for International Development* 103, no. 1/2: 31–49.
- Bowker, G.C., and S.L. Star. 1999. *Sorting things out: Classification and its consequences*. Cambridge, MA: MIT Press.
- Brunsson, N., and B. Jacobsson, eds. 2000. *A world of standards*. Oxford: Oxford University Press.
- Busch, L. 2000. The moral economy of grades and standards. *Journal of Rural Studies* 16: 273–283.
- Busch, L. 2011a. *Standards: Recipes for reality*. Cambridge, MA: MIT Press.
- Busch, L. 2011b. Food standards: The cacophony of governance. *Journal of Experimental Botany* 62, no. 10: 3247–3250.
- Cooke, K.J. 2002. Expertise, book farming, and government agriculture: The origins of agricultural seed certification in the United States. *Agricultural History* 76, no. 3: 524–545.
- Coscione, M., and V. García Pinzón. 2014. TLCs, paro nacional agrario y movimiento social en Colombia. *Nuevo Mundo Mundos Nuevos*. September 21, 2014.
- Da Via, E. 2012. Seed diversity, farmer's rights, and the politics of repeasantization. *International Journal of Sociology of Agriculture and Food* 2, no. 10: 229–242.
- Documento de posición por la defensa de las semillas. 2013. Red de Semillas Libres de Colombia. Accessed September 10, 2013. <http://semillas.org.co/es/revista/documento-de-posici>.
- Duranti, J. 2013. A struggle for survival in Colombia's countryside. *Eyes on Trade*, August 30, 2013. <http://www.bilaterals.org/?a-struggle-for-survival-in>.
- Fitting, E. 2011. *The struggle for maize: Campesinos, workers, and transgenic corn in the Mexican countryside*. Durham: Duke University Press.
- Fitzgerald, D.K. 1990. *The business of breeding: Hybrid corn in Illinois, 1890–1940*. Ithaca: Cornell University Press.
- Harvey, D. 2003. *The new imperialism*. New York: Oxford University Press.
- Hubbard, K. 2009. Out of Hand: Farmers Face the Consequences of a Consolidated Seed Industry. Farmer to Farmer Campaign on Genetic Engineering. Dec 2009.
- Jaffe, W., and J. Van Wijk. 1995. *The impact of plant breeders' rights in developing countries: Debate and experience in Argentina, Chile, Colombia, Mexico and Uruguay*. Amsterdam: University of Amsterdam, Inter-American Institute for Cooperation on Agriculture.
- Jaramillo, C.F. 2002. *Crisis y transformación de la agricultura colombiana 1990–2000*. Bogota: Fondo de Cultura Económica.
- Kloppenborg, J. 1988. *First the seed: The political economy of plant biotechnology, 1492–2000*. Madison: University of Wisconsin Press, 1988 and 2004.
- Kloppenborg, J. 2010. Impending Dispossession, Enabling Repossession: Biological Open Source and the Recovery of Seed Sovereignty. *Journal of Agrarian Change* 10, no. 3: 367–388.
- Kloppenborg, J. 2013. *Repurposing the Master's Tools: The Open Source Seed Initiative and the Struggle for Seed Sovereignty*. Conference paper for discussion at Food Sovereignty: A Critical Dialogue, International Conference at Yale University, September 14–15, 2013.
- Lampland, M., and S.L. Star. 2009. *Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life*. Ithaca: Cornell University Press.
- Las leyes que privatizan y controlan el uso de las semillas, criminalizan las semillas criollas. 2013. Grupo Semillas. *Bogotá*, August 23, 2013. [http://www.biodiversidadla.org/Principal/Secciones/Noticias/Colombia\\_Las\\_leyes\\_que\\_privatizan\\_y\\_controlan\\_el\\_uso\\_de\\_las\\_semillas\\_criminalizan\\_las\\_semillas\\_criollas](http://www.biodiversidadla.org/Principal/Secciones/Noticias/Colombia_Las_leyes_que_privatizan_y_controlan_el_uso_de_las_semillas_criminalizan_las_semillas_criollas).
- Las semillas de la discordia. 2013. Dinero.com – Publicaciones Semana S.A., September 2, 2013.
- Latin America: the mantra of privatization. 2005. GRAIN. Seedling, July 2005.
- Louwaars, N., ed. 2002. *Seed policy, legislation and law: Widening a narrow focus*. Binghamton: Food Products Press.
- Louwaars, N. 2005. Biases and bottlenecks: time to reform the South's inherited seed laws? Seedling – 26 July 2005. GRAIN. <http://www.grain.org/article/entries/473-seed-laws-biases-and-bottlenecks>.
- Machado, A. 2002. *De la estructura agraria al sistema agroindustrial*. Bogota: Universidad Nacional de Colombia.
- McAndrew, Neville. 2001. Coordinating Regional Mechanisms for Facilitating Collaboration and Exchange of Expertise Among Stakeholders Dealing with Seed Production in Latin America

- and the Caribbean, in *Seed Policy and Programmes in the Latin America and the Caribbean*. Rome: FAO.
- McMichael, P. 2009. A food regime genealogy. *Journal of Peasant Studies* 36: 139–169.
- Mooney, P.R. 1979. *Seeds of the earth: A private or public resource?* Ottawa: Canada: Mutual Press Limited Ottawa.
- Ochoa Jiménez, M.J., J.F. Cruz Uribe, and J. Almansa. 2013. Reflexiones en torno a la importancia de la biodiversidad y a los efectos del régimen colombiano de semillas. *Compendium* 16, no. 30: 49–69.
- Olshan, M.A. 1993. Standards-Making Organizations and the Rationalization of American Life. *Sociological Quarterly* 34, no. 2: 319–335.
- Otero, G. 2008. *Food for the few: Neoliberal globalism and biotechnology in Latin America*. Austin, TX: University of Texas Press.
- Otero, G. 2013. El regimen alimentario neoliberal y su crisis: estado, agroempresas multinacionales y biotecnología. *Revista Antípoda*, Issue 17, p. 49.
- Resolution 970. Colombia: ICA, March 10, 2010.
- Santilli, J. 2012. *Agrobiodiversity and the Law: Regulating Genetic Resources, Food Security and Cultural Diversity*. New York: Earthscan.
- Scott, J.C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Seed Laws in Latin America: the offensive continues, so does popular resistance. 2013. GRAIN, Oct 30, 2013. <http://www.grain.org/article/entries/4808-seed-laws-in-latin-america-the->.
- Tripp, R., ed. 1997. *New seed and old laws: Regulatory reform and the diversification of national seed systems*. London: Overseas Development Institute.
- UPOV. [www.upov.int](http://www.upov.int).
- Vellvé, R. 1992. *Saving the seed: Genetic diversity and European agriculture*. London: Earthscan.
- Wilkinson, J. and P. German Castelli. 2000. The Internationalization of Brazil's Seed Industry: Biotechnology, Patents and Biodiversity. Research co-operation agreement: CPDA/UFRRJ and Action Aid. Collaborating Researcher: Ana Celia Castro. Rio de Janeiro.
- Winge, T. 2012. *A Guide to EU Legislation on the Marketing of Seed and Plant Propagating Material in the Context of Agricultural Biodiversity*. Lysaker: Fridtjof Nansen Institute.
- Winston, E.I. 2008. What if seeds were not patentable? *Michigan State Law Review* 2008, no. 1: 321–344.

**Tamara Wattnem** is currently a PhD candidate in sociology at the University of Wisconsin Madison. She holds an MSc in agroecology from the same institution. E-mail: [tamarawattnem@gmail.com](mailto:tamarawattnem@gmail.com)